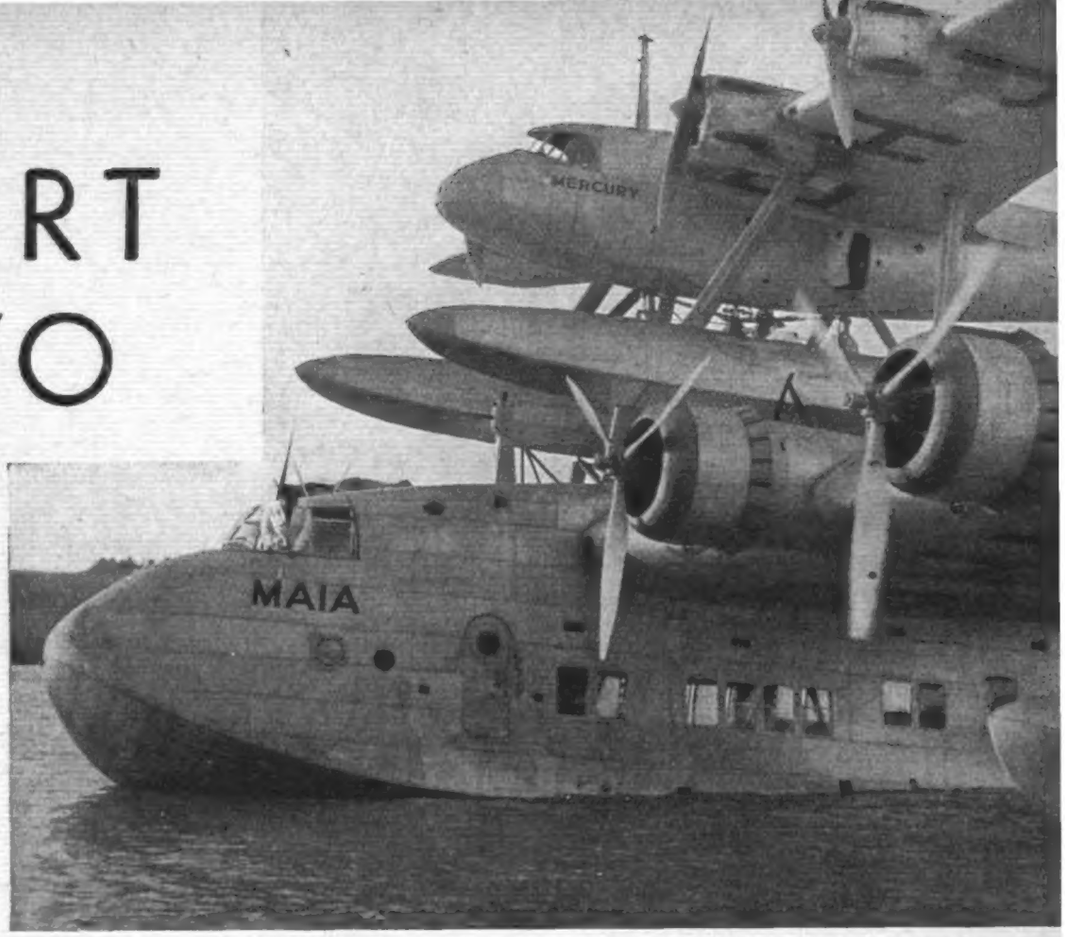
SHORT MAYO

The Composite Aircraft Described in Detail

(Illustrated Mainly with Special "Flight" Photographs and Sketches)

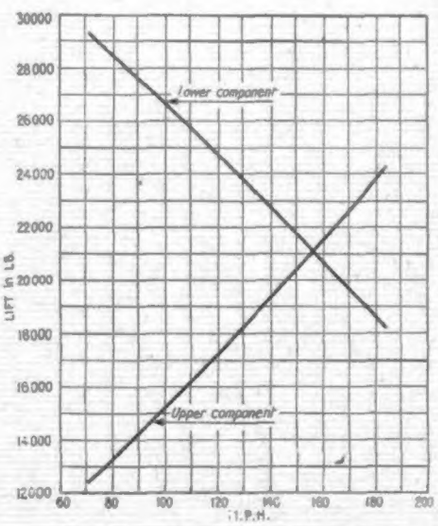


THE successful separation flight of the Short-Mayo composite aircraft, recorded in *Flight* last week, has once more focused attention on one of the most interesting technical experiments made for many years, and has made it possible to publish a detailed description of the aircraft built by Short Brothers, of Rochester, to test out Major R. H. Mayo's theories.

As there is still a good deal of misconception of the fundamental principles involved, it may be useful to examine them again briefly. Readers who wish to study the subject more thoroughly are advised to refer to their copies of *Flight* of November 7 and 14, 1935, in which the Editor explained in simple language the objects and methods of the system.

First of all, it should be pointed out that the *raison d'être* of the composite is to extend the range of an aircraft by assisting it into the air with a greater load than that which it could lift into the air under its own power. Once an aircraft is flying, it needs less power to support itself in flight than that required to take off.

In the Mayo scheme a large but lightly loaded flying boat is used for carrying on its back a much smaller but very heavily loaded floatplane and helping it into the air. When the desired height has been reached the two aircraft separate, the smaller proceeding on its journey and the larger returning to its base.



This graph illustrates how the lift is shared between the two components at different speeds.

(Below) Some of the people responsible for the composite. Left to right: Major Jack Stewart and Major R. H. Mayo, Mr. Arthur Gouge, and Messrs. Jackson and Lipscomb.

One of the mistakes most commonly made is to think that at the moment of separation the lower component, relieved of the weight of the upper, will tend to rise suddenly, while the upper component, suddenly compelled to carry the whole of its own weight, will tend to drop. If that were the case, the operation would indeed be a dangerous one. Actually, the very opposite is the case; the lower component tends to drop and the upper tends to rise, thus automatically providing the force needed to separate the two. It is, perhaps, the realisation of this fact for which Major Mayo deserves the greatest credit. How it is achieved needs a little explanation, starting with basic principles.

Many of *Flight's* readers will be aware that the lift of an aeroplane wing is represented by a curve of lift coefficients plotted against angles of incidence. From the small angle of no lift to the angle of maximum lift the curve is almost a straight line. At the angle of maximum lift the curve turns into a horizontal direction, and then begins to drop again, showing that maximum lift has been exceeded and the wing has begun to stall.

This general shape of lift curve is common to all wing sections, but the values of the lift at the different angles of incidence vary with the type of section used. The secret of the Mayo scheme lies in choosing the two wing sections in such a way that the lift